

Cyberspace may overcome ethical constraints in experiments

December 21 2006

By repeating the Stanley Milgram's classic experiment from the 1960s on obedience to authority – that found people would administer apparently lethal electrical shocks to a stranger at the behest of an authority figure – in a virtual environment, the UCL (University College London) led study demonstrated for the first time that participants reacted as though the situation was real.

The finding, which is reported in the inaugural edition of the journal *PLoS ONE*, demonstrates that virtual environments can provide an alternative way of pursuing laboratory-based experimental research that examines extreme social situations.

Professor Mel Slater, of the UCL Department of Computer Science, who led the study, says:

"The line of research opened up by Milgram was of tremendous importance in the understanding of human behaviour. It has been argued before that immersive virtual environment can provide a useful tool for social psychological studies in general and our results show that this applies even in the extreme social situation investigated by Stanley Milgram."

Stanley Milgram originally carried out the series of experiments in an attempt to understand events in which people carry out horrific acts against their fellows. He showed that in a social structure with recognised lines of authority, ordinary people could be relatively easily persuaded to give what seemed to be even lethal electric shocks to

another randomly chosen person. Today, his results are often quoted in helping to explain how people become embroiled in organised acts of violence against others, for example they have been recently cited to explain prisoner abuse and even suicide bombings.

Following the style of the original experiments, the participants were invited to administer a series of word association memory tests to the (female) virtual human representing the stranger. When she gave an incorrect answer the participants were instructed to administer an 'electric shock' to her, increasing the voltage each time she gave an incorrect answer. She responded with increasing discomfort and protests, eventually demanding termination of the experiment. Of the 34 participants 23 saw and heard the virtual human and 11 communicated with her only through a text interface.

The experiments were conducted in an immersive virtual environment, formed by a computer-generated surrounding real-time display. It delivers a life-sized virtual reality within which a person can experience events and interact with representations of objects and virtual humans.

The results show there was a clear behavioural difference between the two groups depending on whether they could see the virtual human. All participants in the Hidden Condition (HC) administered all 20 shocks. However, in the Visible Condition (VC) 17 gave all 20 shocks, 3 gave 19 shocks, and 18, 16 and 9 shocks were given by one person each.

Participants were asked whether they had considered aborting the experiment. Almost half of those who could see the virtual human indicated they had because of their negative feelings about what was happening. Measurements of physiological indicators including heart rate and heart rate variability also indicated that participants reacted as though the situation was real.

"The results demonstrate that even though all experimental participants knew that the situation was unreal, they nevertheless tended to respond as if it were," Professor Slater.

"This opens the door to the systematic use of virtual environments for laboratory style study of situations that are otherwise impossible whether for practical or ethical reasons – for example, violence associated with football, racial attacks, gang attacks on individuals, and so on. Why do some people participate in such activities even though it is against their nature? The original Milgram experiment helps to explain this, and the exploitation of virtual environments may help to further research into these difficult and pressing questions."

Source: Public Library of Science

Citation: Cyberspace may overcome ethical constraints in experiments (2006, December 21)
retrieved 20 April 2024 from

<https://medicalxpress.com/news/2006-12-cyberspace-ethical-constraints.html>

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